NOTES ON TWO CHRYSIDIDS PARASITIC ON WESTERN BEMBICID WASPS

(Hymenoptera)

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In the spring and fall of 1938 and 1939 we collected a number of aculeate Hymenoptera from the sandy areas of Emeryville and Antioch, California. From the former locality several cocoons of the sand wasp, *Bembix comata* Parker[1] were obtained while at Antioch several hundred cocoons of *Microbembex aurata* Parker[2] were collected. All of these were brought into the laboratory and opened for examination or placed in bottles for rearing. Of the *Bembix comata* cocoons examined, about thirty per cent contained the brown silken cases of the chrysidid wasp, *Parnopes edwardsii* (Cresson)[3]. Approximately the same ratio of parasitism was obtained from unopened cocoons which later emerged. The pupal cases of *Microbembex aurata* were studied in the same manner and were found to be twenty per cent parasitized by *Parnopes westcotti* Melander and Brues[4].

In the field neither species of parasite appeared for at least two weeks after the emergence of its host but the parasites remained active for as long a period after the bembicids were gone. *Parnopes edwardsii*, which is a large, brilliant green species, was found to frequent the blossoms of two sweet clovers, *Melilotus alba* Desr. and *Melilotus indicus* All. The host wasp also visited these flowers. On cloudy days and at night many of the parasites remained hidden beneath loose objects on the sand where they often fell victims to the black widow spider, *Latrodectus mactans* Fabricius, which made its webs in these situations. *Parnopes westcotti*, a smaller green and bronze wasp, was found most commonly at flowers of the small bush, *Croton californicus* Mull., which also attracted many *Microbembex*.

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[1]*Bembix comata* Parker, 1917, Proc. U. S. Nat. Mus., 52:100.
[2]*Microbembex aurata* Parker, 1917, Proc. U. S. Nat. Mus., 52:121.
[3]*Euchrœus edwardsii* Cresson, 1879, Proc. Amer. Ent. Soc., 7:iv.
[4]*Parnopes westcotti* Melander and Brues, 1902, Biological Bulletin, Lancaster, 3:39.

The habits of both parasites in searching for host cocoons are apparently nearly the same. The activities of *Parnopes westcotti* were more completely studied because of the relatively large population of that species. A greater concentration of host burrows allowed it a large share of time for actually digging into host entrances. In contrast, *Parnopes edwardsii* had to search over large areas of sand in order to discover the scattered burrows of its host. While searching, the wasps made short flights close to the sand, alighting frequently to run over the surface, tap rapidly with the tips of their antennæ, and examine every depression. At frequent intervals the wasps would scratch the surface of the sand with their anterior tarsi and, upon finding what was apparently a host entrance, would tunnel their way beneath the loose top sand. The digging efforts of both species are interesting because of their ineffectiveness. In contrast to other aculeates these wasps have neither well developed mandibles nor tarsal combs and have restricted use of their front legs. When starting to dig, the body is raised to an almost vertical position from which they often lose their balance and fall over backwards.

Our observations indicate a striking host specificity for these parasites in the localities studied. At Antioch *Bembix comata* is scarce whereas *Bembix occidentalis beutenmuelleri* Fox is quite abundant. *Parnopes edwardsii* is even rarer at this locality than *Bembix comata* which is, therefore, apparently its only host. In addition, this parasite has never been found in the many cocoons of other *Bembix* from Antioch which have been examined[5]. *Parnopes edwardsii* has a wider geographical range than *Bembix comata*, however, and has been collected on sweet clover at Walla Walla, Washington, in company with *Bembix amœna* Handlirsch. *Parnopes westcotti* has not been taken from *Bembix* cocoons but will most likely be found as a parasite of the common and wide ranging *Microbembex monodonata* Say, since these two have been collected together in the absence of *Microbembex aurata*. At Emeryville both species of *Microbembex* are present but are not parasitized by chrysidids.

[5]Bohart, G. E., and J. W. MacSwain, 1939. The life history of the sand wasp, *Bembix occidentalis beutenmuelleri* Fox and its parasites. Bull. South. Calif. Acad, Sci., 38:84-98.